Math 1171

Homework # 5

2.3 # 45, 69

2.4 # 24

2.5 #64

2.3 #45 $J(u) = \left(\frac{1}{u} + \frac{1}{u^2}\right)\left(u + \frac{1}{u}\right)$

$= (u^{-1} + u^{-2})(u + u^{-1})$

$J'(u) = (u^{-1} + u^{-2}) \cdot (1 + -u^{-2}) + (u + u^{-1})(-u^{-2} + -2u^{-3})$

2.3 #69 $f(x) = \frac{x^2}{1+2x}$

$f'(x) = \frac{(1+2x)\cdot 2x - x^2 \cdot 2}{(1+2x)^2}$

$= \frac{2x + 4x^2 - 2x^2}{(1+2x)^2} = \frac{2x + 2x^2}{(1+2x)^2}$

$f''(x) = \frac{(1+2x)^2 \cdot (2+4x) - (2x+2x^2)\cdot 2(1+2x)\cdot 2}{(1+2x)^4}$

2.4 #24 Show $\frac{d}{dx}\sec x = \sec x \tan x$

Pf $\frac{d}{dx}\sec x = \frac{d}{dx}\frac{1}{\cos x} = \frac{\cos x \cdot 0 - 1 \cdot -\sin x}{\cos^2 x}$

$= \frac{\sin x}{\cos^2 x} = \frac{1}{\cos x} \cdot \frac{\sin x}{\cos x}$

$= \sec x \cdot \tan x$

Shown!

2.5 #64 $h(x) = (4+3f(x))^{1/2}$

$h'(x) = \frac{1}{2}(4+3f(x))^{-1/2} \cdot 3f'(x)$

So $h'(1) = \frac{1}{2}(4+3\cdot f(1))^{-1/2} \cdot 3f'(1)$

$= \frac{1}{2}(4+3\cdot 7)^{-1/2} \cdot 3 \cdot 4$

$= \frac{1}{2} \cdot 25^{-1/2} \cdot 12$

$= 6/5$